

REMARKS

Claims 1-20 are in this application and are presented for consideration. By this Amendment, Applicant has amended claims 1-6. New claims 7-20 have been added. Applicant has also attached a substitute specification as well as a marked-up copy of the specification.

The Office Action has provided guidelines for the preferred layout of the specification. Applicant has submitted a substitute specification as well as a marked up copy the specification. Applicant has amended the specification to provide the appropriate section headings.

Claim 3 has been objected to because of minor informalities. Applicant has amended claim 3 to cure the minor informalities. Applicant would like to thank the examiner for the careful review of the claims.

Claims 1-6 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant has amended claims 1-6 paying close attention to the Examiner's remarks. It is Applicant's position that claims 1-6 as now presented are clear and satisfy the requirements of the statute.

Claims 1-4 and 6 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Szenthmihaly (US 4,106,526).

The present invention relates to a compression fitting for pipes. The compression fitting comprises an internal element and an external sleeve. The internal element has an external surface defining at least one circumferential groove. The external sleeve has a defined internal cylindrical surface and a defined external cylindrical surface. A pipe having a defined pipe wall

is fitted onto the internal element. The external sleeve is positioned over the pipe so that the pipe is in contact with the cylindrical internal surface of the external sleeve and the external surface of the internal element. The external cylindrical surface of the external sleeve defines at least one protruding circumferential bead in an area corresponding with the groove of the internal element. The bead is radially compressed so that the external sleeve is deformed which in turn deforms the pipe and causes the pipe to bend into the grooves so that the pipe is connected to the internal element. The width of the groove is greater than the thickness of the pipe wall and the maximum depth of the groove is equal to at least a quarter of the thickness of the pipe wall. The width of the bead is less than the width of the groove of the internal element and the height of the bead is at least equal to the depth of the groove. The prior art as a whole fails to disclose such features.

The dimensional ratios as claimed advantageously allow the pipe to be deformed radially to take on a winding path by deformation of the external sleeve without excessive localized pressures being created so that the pipe thickness is not excessively lessened. Applicant has discovered that it is essential that the width of the bead be less than the width of the corresponding groove so that the pipe is fully accepted by the grooves. These dimensional parameters advantageously allow the compression fitting to be used with pipes that must be radially deformed by a mere change of their diameter without a reduction of the wall thickness. The invention advantageously provides a compression fitting having excellent axial hold that is easy to install and that is highly reliable both for mechanical resistance against withdrawal and for hydraulic seal. The prior art as a whole fails to disclose such advantages.

Szentmihaly discloses a hose end unit comprising a reinforced hose end portion having an inner cylindrical elastomeric liner and a reinforcement layer and an end fitting. The end fitting comprises an insert 10 formed integrally with a nipple 11 to enter into the end portion of the hose. A plurality of radially inward projections are provided on the ferrule 12 and the ferrule 12 is swaged around the insert 10 so that the hose end portion is gripped between the insert 10 and the ferrule 12 by the projections. The insert 10 is provided with an annular groove 14 which receives a radially inwardly extending annular abutment on the ferrule 12. The insert is provided with radially outwardly extending annular projections 20 to grip the hose end portion 16. Radially inwardly extending abutments 25 are separated by depressions 26. The abutments 25 are arranged slightly offset from projections 20 on the insert.

Szentmihaly fails to teach or suggest the combination of an external sleeve arranged around a portion of a pipe. In the present invention, the pipe is in contact with an external surface of an internal element and a cylindrical internal surface of an external sleeve. At most Szentmihaly teaches a plurality of radially inward projections provided on a ferrule 12, which is swaged around an insert 10 so that the hose end portion is gripped between the insert and the ferrule 12 by the projections. The present invention takes a different approach than that of Szentmihaly. In the present invention, a pipe is fitted onto an internal element having at least one circumferential groove. In the present invention, an external sleeve having a circumferential protruding bead is fitted over the pipe. The bead of the present invention is in line with an area of the groove of the internal element. The bead of the present invention is radially compressed to deform the pipe so that the pipe engages the bottom of the groove and adheres to the groove

so that the pipe is connected to the internal element. This provides a compression fitting that is advantageously highly reliable both for mechanical resistance against withdrawal and for hydraulic seal. Szenthmihaly fails to provide such an advantage since Szenthmihaly fails to disclose that the ferrule 12 is deformed to attach to the end fitting. In fact, Szenthmihaly teaches away from the present invention since Szenthmihaly suggests that the ferrule 12 is subjected to a radial movement (Column 3, lines 21-25). As such, Szenthmihaly fails to teach the combination of features as claimed.

Further Szenthmihaly fails to disclose that the ferrule 12 has a cylindrical inner surface. As clearly shown in figure 3 of Szenthmihaly the ferrule 12 has inner projections 25 and clearly fails to have a cylindrical inner surface. Szenthmihaly also fails to disclose the dimensional ratios as claimed in the present invention. Szenthmihaly fails to disclose that the width of annular groove 14 is greater than a thickness of a pipe wall and that the maximum depth of the annular groove 14 is equal to at least a quarter of the thickness of the pipe wall. In contrast to the present invention, Szenthmihaly fails to disclose that the end fitting attaches to a pipe by radially compressing a bead on an external sleeve. The dimensional ratios of the present invention are significant because they allow the pipe to correctly and effectively be deformed without any substantial reduction of the pipe wall thickness. The dimensional parameters of the present invention advantageously allows the pipe to properly deform into the grooves of internal element so that the pipe is connected to the internal element. Szenthmihaly fails to disclose the dimensional parameters as claimed. As such Szenthmihaly teaches a different approach and fails to suggest the features and advantages of the present invention.

Accordingly, Applicant respectfully requests that the Examiner favorably consider claim 1 and all claims respectively depending thereon.

Claims 1-6 have been rejected under a 35 U.S.C. 103(a) is being unpatentable over German Patent 10137078 (hereinafter "German Patent '078") in view of Szenthmihaly or Szegda (US 4,990,016).

German Patent '078 discloses a press fitting for a plastic or multilayered composite pipes. The press fitting comprises a support sleeve 14 with an outer surface 28. The other surface 28 has at least one peripheral annular groove 24, a sealing element 26 completely arranged within the annular groove and a plastically deformable press sleeve 16 surrounding the support sleeve 14. A pipe end to be connected slides between the support sleeve 14 and the press sleeve 16. In a preferred embodiment, at least one annular deformation shoulder 40 is provided on an outer surface 38 of the press sleeve 16 and lies opposite the annular groove 24. Pipe material is pressed into the annular groove 24 upon pressing the pipe end. At least two annular grooves are provided on the outer surface of the support sleeve 14.

German Patent '078 fails to teach or suggest the dimensional ratios of the present invention. Specifically German Patent '078 fails to disclose that the annular deformation shoulder 40 has a height that is at least equal to the depth of the annular groove 24. As clearly shown in Figure 3 of German Patent '078 the annular deformation shoulder 40 has a height less than that of the annular groove 24. The dimensional ratios of the present invention are significant because they allow the pipe to correctly and effectively be deformed without any substantial reduction of the pipe wall thickness. This provides a connection that provides strong

axial holding of the pipe. The present invention solves a different problem than that disclosed in German Patent '078. German Patent '078 is concerned with solving the problem of avoiding excessive diametric deformation of a pipe so as not to damage elastic gasket elements 26. In contrast to German Patent '078 the present invention is concerned with solving the problem of deeply deforming a pipe in the sense of locally diminishing the pipe's diameter to reach a winding path that adapts to an internal element that has wide and deep grooves to mechanically anchor the pipe against withdrawal.

Further, German Patent '078 fails to teach or suggest the combination of a bead having a width that is less than the width of a groove of an internal element. As clearly shown in figures 2, 3 and 4 of German Patent '078 the annular deformation shoulder 40 has a width that is greater than the width of the annular groove 24. The dimensional ratio of the bead with respect to the groove of the internal element is significant because it assures that the pipe wall is correctly and effectively deformed into the groove of the internal element so that the pipe is securely connected to the internal element. This advantageously provides a pressure joint that is highly reliable both for mechanical resistance against withdrawal and for hydraulic seal. German Patent '078 fails to provide such an advantage because the width of the annular deformation shoulder 40 is greater than that of the width of the annular groove 24. Applicant has discovered that by compressing a bead having a width less than the width of a groove of an internal element a greater amount of pipe advantageously contacts the bottom of the groove to provide a stronger connection between the pipe end the internal element. German Patent '078 disadvantageously provides a less secure connection of the support sleeve 14 to the element 22

since the annular deformation shoulder 40 has a greater width than the annular groove 24 which fails to allow the pipe to be properly deformed to completely fill the annular groove 24. German Patent '078 fails to suggest the dimensional parameters as claimed in the present invention. As such, the prior art teaches a different approach and fails to teach or suggest the features of the present invention. Accordingly, Applicant respectfully requests that the Examiner favorably consider claim 1 and all claims that respectively depend thereon.

Although Szegda teaches an end connector 10 having a tubular body 40, the references as a whole fail to suggest the combination of features claimed. Specifically, German Patent '078 fails to teach or suggest the dimensional parameters of the present invention. Further, The references provide no direction or using teachings of Szegda to modify German Patent '078. The references do not suggest the invention and therefore all claims define over the prior art as a whole.

As previously discussed above, Szentmihaly fails to teach or suggest the features of the present invention. As such, the reference does not suggest the invention and therefore all claims define over the prior art as a whole.

Applicant has added new claims 7-20. Independent claim 8 relates to an assembled compression fitting relating to the combination of an internal element, a pipe and an external sleeve. Independent claim 8 provides for similar advantages as previously discussed in regard to claim 1. Independent claim 15 relates to a method of producing compression fittings. The method comprises providing an internal element and requires the particulars of independent claim 8. The internal element is fitted with a pipe and an external sleeve is connected to the

pipe. The external sleeve has a circumferential protruding bead. The bead is compressed so that the pipe bends into a groove of the internal element so that the internal element is securely fixed to the pipe. This advantageously provides for a strong connection between the internal element and the pipe and provides for excellent hydraulic seal. The prior art as a whole fails to provide such features or advantages. Accordingly, Applicant respectfully requests that the Examiner favorably consider new claims 7-20.

Further action on the merits is requested.

Respectfully submitted
for Applicant,



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Attached: Substitute Specification
 Marked-Up Specification
 Petition for One Month Extension of Time

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